

WHAT IS CLAIMED IS:

1. A filter for an electrical power system, comprising:  
a plurality of voltage storage devices coupled to system lines to obtain voltages related to currents in the respective lines;  
an error amplifier coupled to the voltage storage devices and operable to output  
5 a signal based on a difference in voltage between the voltage storage devices;  
the output signal coupled to another voltage storage device to obtain a voltage with respect to the output signal; and  
wherein the voltage obtained from the output signal influences the difference in voltages between the voltage storage devices to decrease the difference.

2. The circuit according to claim 1, wherein the voltage storage devices are capacitors.

3. The circuit according to claim 1, wherein at least one system line is an input power line, and at least one other system line is a ground line.

4. The circuit according to claim 1, wherein the system lines are input power lines.

5. The circuit according to claim 1, further comprising:  
a power supply to the error amplifier for powering the error amplifier; and  
the power supply being coupled to one or more input lines in the electrical power system.

6. The circuit according to claim 1, wherein the electrical power system is a single phase system.

7. The circuit according to claim 1, wherein the electrical power system is a three-phase system.

8. The circuit according to claim 5, wherein the power supply includes a rectifier.

9. The circuit according to claim 5, wherein the power supply includes a controlled resistance device.

10. The circuit according to claim 8, wherein the power supply further comprises a controlled resistance device.

11. The circuit according to claim 1, further comprising a regulated voltage source supplied to the error amplifier for powering the error amplifier.

12. The circuit according to claim 11, wherein the voltage regulator is coupled to one or more input lines in the electrical power system.

13. The circuit according to claim 11, wherein the voltage regulator includes a controlled resistance.

14. The circuit according to claim 13, wherein the controlled resistances coupled to a voltage control feedback loop to obtain a regulated voltage output.

15. A method for reducing EMI in an electrical power circuit with an active EMI filter, comprising:

sensing a voltage on at least one of an input and ground line related to current through the line;

- 5       sensing voltage in at least another of the input and ground line;  
      comparing the sense to voltages and providing a voltage signal based on differences between the voltages; and  
      applying the voltage signal to at least one of the input and ground lines to thereby reduce the voltage difference.

16. The method according to claim 15, further comprising amplifying the voltage difference to obtain a closed loop feedback control.

17. An active EMI filter, comprising:  
      an error amplifier for amplifying an error signal;  
      a capacitor coupled to an input of the error amplifier for developing a voltage related to a sensed current;

- 5       a second capacitor coupled to a second input of the error amplifier for developing a voltage related to a sensed current;

      an output capacitor coupled to an output of the error amplifier and at least one of the first and second capacitors;

      a voltage regulator coupled to a power supply input of the error amplifier; and

- 10       wherein the error amplifier is operable to detect a difference in voltages developed across the first and second capacitors and supply a voltage to the output capacitor to compensate the difference in voltages between the first and second capacitors.

18. An EMI filter, comprising:

      a variable voltage source being controllable based on a sensed electrical signal;

an impedance coupled to the variable voltage source;

5 a node having common mode noise comprising a noise voltage and a device impedance, the node being common with the variable voltage source;

a controller for the variable voltage source, coupled to the variable voltage source and operable to produce a current in combination with the impedance to match a current obtained from the noise voltage source and device impedance at the node.